form of *Lactuca canadensis*. The identity of *Sonchus biennis* Moench is not absolutely established but Gray had no doubt about it; and Moench's comparison of it with *S. alpinus* L., a European species with which our plant was much confused by early European authors (including Linnaeus) makes the identification reasonable. I, therefore, take up *L. biennis*, at least until Moench's type at Marburg can be examined. At any rate, we can use for our plant neither of the familiar names, *L. leucophaea* nor *L. spicata*.

The following forms should be noted.

L. BIENNIS, forma **integrifolia** (T. & G.), comb. nov. *Mulgedium leucophaeum*, β. *integrifolia* T. & G. Fl. ii. 499 (1843). *L. spicata*, var. *integrifolia* (T. & G.) Britton in Mem. Torr. Bot. Cl. v. 350 (1894). *L. spicata*, var. *aurea*, forma *integrifolia* Jennings in Ann. Carnegie Mus. xiii. 443, pl. 33 (1922).

L. BIENNIS, forma **aurea** (Jennings), comb. nov. *L. spicata*, var. *aurea* Jennings, l. c. 440 (1922).

III. ON TWO WEEDY CRUCIFERS

REED C. ROLLINS[1]

DURING the last few years, weed specialists and agronomic botanists in America have become aware that two species of pernicious crucifers were passing in weed-surveys and bulletins as the same plant. Weed-manuals have usually given the common name of these plants as "hoary cress" or in some cases as "white-top". From the striking similarity of the two species, which have frequently been found growing in the same field, it is no wonder that they have been confused. Yet, taxonomically, the two have usually been known in separate genera under the names of *Lepidium Draba* L. and *Hymenophysa pubescens* C. A. Meyer. Both are introductions from the Old World and are apparently spreading rapidly, particularly in western North America. Repeated queries regarding the systematic position of these species have prompted a detailed examination of each with a view to determining their generic relationships.

Historically, *Lepidium Draba*, so-called, has often been thought of as an aberrant species in the genus *Lepidium*. Lin-

[1] Society of Fellows of Harvard University.

naeus himself in the tenth edition of his Systema and second edition of Species Plantarum shifted it from *Lepidium* to *Cochlearia*. Since that time, "*L. Draba*" or one of its numerous subspecies, varieties or forms has been placed, by different authors, in no less than five genera[1] other than *Lepidium*. Almost without exception, treatments of *Lepidium* have either excluded "*L. Draba*" or placed it by itself in a separate section or subsection of the genus. Thus, nearly everyone who has dealt with the plant has been impressed by its singular peculiarities and was not satisfied to give it equality with the general run of species in *Lepidium*. Some of the salient points of difference between "*L. Draba*" and the other species of *Lepidium* may be summarized as follows: 1, the fruits of "*L. Draba*" are indehiscent, those of *Lepidium* are dehiscent; 2, the siliques of "*L. Draba*" are neither strongly flattened nor carinate-margined, while in the rest of *Lepidium* the siliques are strongly flattened contrary to the narrow septum and the margins are either carinate or at least strongly compressed; 3, the siliques of "*L. Draba*" are somewhat inflated (markedly so in var. *repens*), whereas the siliques of *Lepidium* proper are uninflated; 4, the nectar-glands in "*L. Draba*" are comparatively large and well developed, completely surrounding the base of the single stamens and subtending the paired stamens but in the rest of *Lepidium* the nectar-glands are small, poorly developed, merely subtending the single stamens and only weakly developed below the paired stamens, or are absent entirely. According to Schulz,[2] myrosin-cells are found in the vascular bundles of "*L. Draba*", but none have been found in the vascular bundles of those species of *Lepidium* proper which have been investigated. Although the latter point does not have any practical taxonomic importance, it adds weight to the evidence against a presumed close direct relationship between "*L. Draba*" and other species of *Lepidium*. Taking all available evidence into consideration, it appears to be a mistake to continue "*L. Draba*" as a species in the genus *Lepidium*. The earliest generic name to which this species may

[1] *Nasturtium*, Crantz, Crucif. 91 (1769); *Cardaria*, Desvaux, Journ. de Bot. **3**: 163 (1814); *Draba*, Baumg., Enum. Stirp. Transilv. **2**: 232 (1916); *Cardiolepis*, Wallr., Sched. Crit. 340 (1822); *Physolepidion*, Schrenk, Enum. Pl. Nov. 97 (1841).

[2] Engler's Pflanzenf. **17b**: 416 and 476 (1936).

be referred is *Cardaria* of Desvaux l. c., hence the plant in question should be known as *Cardaria Draba* (L.) Desv.

The striking habital resemblance between *Cardaria Draba* and *Hymenophysa pubescens* suggests a closer relationship between the two than has usually been admitted. A detailed study of *H. pubescens* has not revealed a single valid reason for its not being considered congeneric with *C. Draba.* The siliques of *H. pubescens* are inflated and indehiscent; the seeds are large and have incumbent cotyledons; there is only one seed in each loculus of the ovary; the petals are broad-limbed and narrow-clawed as in *C. Draba;* and the style is of the same type as that found in the latter species. Most authors have separated *Hymenophysa* from *Lepidium* on the basis of its subglobose inflated silique and broad septum, but these characteristics are shared also by *C. Draba* var. *repens*, and to a lesser extent by typical *C. Draba.* The most important character which *Cardaria Draba* and *Hymenophysa pubescens* have in common is an indehiscent silique. In the species of *Lepidium* with which I am familiar, the siliques are definitely dehiscent. The extent of development and disposition of the nectaries of *C. Draba* and *H. pubescens* are similar, and both species possess myrosin-cells in their vascular bundles which seemingly further indicates close relationship. The available evidence indicates that *H. pubescens* should be placed in the genus *Cardaria*, which I should constitute as follows:

1. CARDARIA DRABA (L.) Desv.; based on *Lepidium Draba* L., Sp. Pl. **2:** 645 (1753). Type species of the genus.

The oldest American specimen of *C. Draba* in the Gray Herbarium, is *E. L. Greene no. 783*, collected near Yreka, California, in 1876. The species is now widely distributed in North America as a noxious weed. It is particularly troublesome in the slightly alkaline soils of many irrigated districts in western America, though it is by no means restricted to this type of habitat. Specimens of *C. Draba* have been seen from Nova Scotia, Massachusetts, Connecticut, New York, New Jersey, District of Columbia, Illinois, Nebraska, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, California, Oregon and Washington.

1a. C. DRABA (L.) Desv., var. REPENS (Schrenk) O. E. Schulz; based on *Physolepidion repens* Schrenk, Enum. Pl. Nov. 97 (1841).

Specimens of the variety have been seen from Alberta, South Dakota, California, Oregon and Washington. O. E. Schulz, l. c., has named these plants forma *macrocarpa*, but the additional epithet is not necessary for a clear understanding of variety *repens*.

2. C. **pubescens** (Meyer), comb. nov.; based on *Hymenophysa pubescens* C. A. Meyer in Ledeb. Ic. Pl. **2:** 20 (1830) tab. 165, and Fl. Alt. **3:** 181 (1831).

The plants of this species which have been introduced into North America are not typical of the species as originally described or of specimens coming from Central Asia. Our weeds have a much more elongated fruiting raceme and smaller siliques than those described and figured by Meyer, l. c., and by Busch.[1] There are four specimens of *C. pubescens* from the Altai region in the Gray Herbarium, all of which have a short dense raceme, compact subcorymbose inflorescence and larger siliques than specimens from North America. On the other hand, a specimen collected in 1939 in the territory of Neuquen, Argentina by A. Chicchi, is typical of the Altai plants. The Argentina collection, so far as I am aware, is the first collection of this weedy crucifer from South America. It should be pointed out that Schulz's illustration in Die Pflanzenfamilien[2] is of the plant which we now have as a weed in the United States and Canada. His figures so nearly match specimens collected in Idaho by Mrs. Soth, which were known to have been sent to him at the Berlin Herbarium,[3] that it is not improbable that these drawings were actually taken from Idaho-grown material. As near as I have been able to learn, the weedy *Cardaria pubescens* as found in North America is an undescribed variety which perhaps originally came from some area south and west of the Altai district of central Asia. Import-records indicate that the seeds of these plants were brought to America as impurities in Alfalfa seed.[4] The variety which is extant in North America is named as follows:

[1] Fl. Sib. et Orient. Extr. 107 (1913).

[2] Engler's Pflanzenf. 2 Aufl. **17b:** 477 (1936).

[3] Science **62:** 509 (1925).

[4] Mr. Herbert Groh of Ottawa is actively interested, and has a forthcoming paper on this subject.

2b. C. PUBESCENS (Meyer) Rollins, var. **elongata** var. nov. Herba perennis; inflorescentiis 4–10 cm. longis; siliquis 2.5–3.5 mm. latis. MICHIGAN: Ypsilanti, June, 1919, *C. Billington* s. n. (G); Aug., 1919, *B. A. Walpole* s. n. (G). IDAHO: Pocatello, July & Aug., 1925, *Mrs. M. E. Soth* s. n. (G, NY, US). WYOMING: near Powell, Park Co., June, 1933, *Rollins 324* (R). COLORADO: Fort Collins, *B. Thornton 1* (US); near La Jara, Aug., 1926, *M. W. Talbot* s. n. (US). CALIFORNIA: edge of an alfalfa field, near Sacramento, June, 1932, *Bellue* s. n. (US). OREGON: near Redmond, Sept., 1922, *Whited 499* (G); near Burns, Harney Co., July 9, 1933, *J. W. Thompson 11960* (G, TYPE; NY, US, *isotypes*); Klamath Falls, June, 1923, *Applegate 3603* (G). WASHINGTON: roadside south of Ellensburg, June, 1933, *Thompson 9047* (G, US); May, 1935, *Thompson 11539* (G, NY, US); near Tonasket, June, 1931, *Thompson 7107* (G, US); wheat field, Pullman, July, 1925, *R. F. Haxton* s. n. (G). Presumably the same plant has been reported from Pennsylvania by J. M. Fogg, Jr.,[1] but I have not seen specimens of the collections cited. Our plants are neither of the following species which have not turned up as weeds in North America.

Although I have not seen specimens of *Hymenophysa fenestrata* and *H. macrocarpa*, judging by their descriptions and notes concerning them, they are also to be included in *Cardaria*.

3. C. **fenestrata** (Boiss.), comb. nov.; based on *Hymenophysa fenestrata* Boiss. in Ann. Sci. Natur. Bot. **17**[2]**:** 197 (1842). Turkestan.

4. C. **macrocarpa** (Franch.), comb. nov.; based on *Hymenophysa macrocarpa* Franch. in Ann. Sci. Natur. Bot. **15**[6]**:** 233 (1883). Persia.

CONTRIBUTIONS TO THE BOTANY OF MICHIGAN NO. 17

OLIVER A. FARWELL

This number of the Contributions deals with new varieties and with plants that are, as far as my knowledge goes, recorded for Michigan for the first time and extensions of range.

I extend my sincere thanks to Prof. M. L. Fernald for timely suggestions and comments.

PANICUM BOREALE Nash, var. **michiganense,** n. var., *foliis subtus et vaginis plus minusve pubescentibus pustulatis paginis supra hirsutis et nodorum dorsis ad vaginarum apices pubescenti-*

[1] RHODORA **39:** 190 (1937).